Claims

[c1] A test pattern comprising:

a plurality of feature patterns;

a plurality of horizontal line patterns; and

a plurality of vertical line patterns, wherein the feature patterns are interleaved with the horizontal line patterns and the vertical line patterns.

[c2] The test pattern of claim 1, wherein a first feature pattern is located at the center of the test pattern.

[c3] The test pattern of claim 2, wherein each corner of the test pattern includes a feature pattern.

[c4] The test pattern of claim 3, wherein a midpoint of each radius of the test pattern includes a feature pattern.

[c5] The test pattern of claim 4, wherein a midpoint of each side of the test pattern includes a feature pattern.

[c6] The test pattern of claim 1, wherein the test pattern includes a plurality of rows and a plurality of columns, and wherein at least one horizontal line pattern is located in each column of the test pattern and at least one vertical line pattern is located in each row of the test pattern.

[c7] The test pattern of claim 1, wherein each horizontal line pattern and each vertical line pattern includes a plurality of

sets of lines, wherein each set of lines includes a plurality of lines and each line in a set of lines has an identical line width and is separated from an adjacent line by a space having a space width, and wherein the line width and the space width for the plurality of sets of lines varies from less than a nominal resolution limit of a lithography tool to greater than the nominal resolution limit.

[c8] The test pattern of claim 1, wherein each feature pattern includes:

a plurality of sets of positive tone holes; and

a plurality of sets of negative tone holes; wherein each set of holes includes a plurality of holes having an identical size, and wherein the sizes for the plurality of sets of holes vary from less than a nominal resolution limit of a lithography tool to greater than the nominal resolution limit.

[c9] The test pattern of claim 1, wherein each feature pattern includes:

a set of isolated lines;

a set of isolated spaces;

a set of finger arrays; and

a set of contact holes;

wherein each set includes at least one feature size that varies from less than a nominal resolution limit of a lithography tool to greater than the nominal resolution limit.

[c10] A test pattern comprising:

a plurality of feature patterns, wherein each feature pattern includes a plurality of sub-patterns that include:

a set of finger arrays;

a plurality of sets of positive tone holes; and

a plurality of sets of negative tone holes;

wherein each sub-pattern includes at least one feature that varies in size from less than a nominal resolution limit of a lithography tool to greater than the nominal resolution limit.

[c11] The test pattern of claim 10, further comprising a plurality of horizontal line patterns interleaved with the feature patterns.

[c12] The test pattern of claim 10, further comprising a plurality of vertical line patterns interleaved with the feature patterns.

[c13] The test pattern of claim 10, wherein the plurality of sub-patterns further include a set of contact holes.

[c14] The test pattern of claim 10, wherein the plurality of sub-patterns further include:

a set of isolated lines;

a set of isolated spaces;

a set of diagonal crosses;

a set of rectangles having intersecting isolated spaces; and

a set of rectangles having isolated lines extending therefrom.

[c15] A method of evaluating a lithography tool resolution, the

method comprising:

exposing a test pattern on a resist coated substrate and generating a test pattern image, wherein the test pattern includes:

a plurality of horizontal line patterns;

a plurality of vertical line patterns; and

a plurality of feature patterns interleaved with the horizontal line patterns and the vertical line patterns; and

analyzing the test pattern image to evaluate the lithography tool resolution.

[c16] The method of claim 15, further comprising:

varying at least one exposure condition selected from the group consisting of: a focus coil excitation, a stigmator correction coil excitation, and a beam exposure time; and

repeating the exposing step for a second location on the test substrate using the at least one varied exposure condition.

[c17] The method of claim 15, wherein the analyzing step includes:

measuring at least one critical dimension of the test pattern image; and

examining the test pattern image using a microscope.

[c18] The method of claim 17, further comprising adjusting the lithography tool resolution based on the analysis of the test pattern image.

[c19] The method of claim 18, wherein the adjusting step includes correcting at least one of focus and astigmatism based on feature patterns in the test pattern image, wherein the feature patterns are located at a center of the test pattern image, each corner of the test pattern image, a midpoint of each radius of the test pattern image, and a midpoint of each side of the test pattern image.

[c20] The method of claim 15, wherein each feature pattern includes a plurality of sub-patterns that include:
a plurality of sets of positive tone holes; and
a plurality of sets of negative tone holes;
wherein each sub-pattern includes at least one feature that varies in size from less than a nominal resolution limit of the lithography tool to greater than the nominal resolution limit.